COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2012 - 2015	Vol. 25: 103 – 109

BIOMETRICAL CHARACTERISTICS FOR *MUS SPICILEGUS, APODEMUS FLAVICOLLIS* AND *APODEMUS SYLVATICUS* SPECIES IN THE MIDDLE BASIN OF THE SIRET RIVER

DALIA PARASCHIV*

ABSTRACT

The paper presents the results of the statistical analysis of 14 body and skull characters of 3 species: *Mus spicilegus, Apodemus flavicollis* and *Apodemus sylvaticus*.

For the species *Mus spicilegus* the lowest values of the variability indices were recorded for the length of the jugal teeth lower row (2,59±0,07) and the width of the auditive bubble (2,95±0,03).

The lowest variability degree for the species *Apodemus flavicollis* had the following skull characteristics: the width of the auditive bubble (3,21±0,1), the length of the jugal teeth upper row (3,82±0,01) and the interorbital constriction (4,11±0,03).

In the species *Apodemus sylvaticus* lower variability degrees were noticed for the following characteristics: the width of the auditive bubble (2,7±0,02), the length of the auditive bubble (2,96±0,04), the length of the jugal teeth lower row (3,31±0,04), the length of the jugal teeth upper row (4,03±0,03) and the interorbital constriction (3,93±0,04).

The obtained data were compared with those from the specialty literature.

Key words: biometrical characteristics, rodent, Siret basin

Introduction

Studying the variability of the body and skull characters is of great importance in characterizing the micromammals. The skull characters weigh more than the body characters, concerning the population characterization and the study of their variability clarifies certain aspects about their instraspecific taxonomy.

We investigated 14 body and craniometric characters of the *Mus spicilegus, Apodemus flavicollis* and *Apodemus sylvaticus* species.

Material and methods

The biometric characters investigated for the 3 species are: tail length (LC), body length: body + tail (LC+T), ear length (LU), hind paw length (LP), nasal bone length, interorbital (constriction) distance, zygomatic width, candilobase length, skull width, width of the upper jugal teeth row, diastema length, the length of the lower jugal teeth row, auditive bubble length, auditive bubble width (3).

Because we worked with lots representing only a part of the general population, in order to appreciate to what extent that lot could represent the whole population, we established the possible limits of the deviations, for each character, i.e. the absolute error (m) and the relative error (m%) (6).

The analysis of the variability for the species *Mus spicilegus* was conducted with the support of the collections made in three villages situated in the middle basin of the Siret river: Bereşti-Tazlău, Sănduleni and Bârsăneşti.

The biometrical data for the species *Mus spicilegus* were obtained with the support of the collections made in four villages situated in the middle basin of the Siret river: Sănduleni, Valea Uzului, Vânători and Taşca and for the species *Apodemus sylvaticus* with the support of the collections made in other three villages situated in the middle basin of the Siret river: Plopana, Mănăstirea Caşin and Livezi.

Results and discussions

Following the descriptive analysis of the skull characters investigated for the *Mus spicilegus* species, we can notice that the lowest values of the variability indices were recorded for the length of the lower jugal teeth row (2,59±0,07) and the auditive bubble width (2,95±0,03) (table 1, fig. 1).

The results obtained in this study were compared with those obtained by various researchers (table 2) (3,4,5). Analysing the medium values for the compared characteristics, we can notice that the population investigated in this study is similar with those investigated by V. SIMIONESCU (1965) and M. POPOVICI (2006). We also notice differences concerning the medium values of the compared characteristics with those investigated by S.

*"Ion Borcea" Natural Science Museum Complex, Aleea Parcului, no 9, Bacău, dalia_yvs@yahoo.com

HELWING and GHIZELEA (1963) for a *Mus spicilegus* species in Iaşi. Among the body metrical characteristics we notice an exception for the ear length, and among skull characteristics – the interorbital constriction and the diastema length, for which there was noticed a medium value close to that obtained in the present study.

The amount data obtained following the measurements conducted in the species *Apodemus flavicollis* were statistically processed, estimating for each characteristic indicators of the main trend and of the variability: the arithmetic mean, the amplitude, the middle error, the standard deviation, the variability coefficient (table 3).

The lowest variability degree could be noticed for the following skull characteristics: auditive bubble width (3,21±0,1), the length of the jugal teeth upper row (3,83±0,01) and the interorbital constriction (4,11±0,03) (table 3, fig. 2).

Comparing the medium values of some characteristics to those in the specialty literature, we notice that mostly they are close to those of the populations investigated by other authors; among the body metrical characteristics, the tail length has slightly lower medium values and among the skull characteristics the length of the jugal teeth upper row has lower medium values and the length and the width of the auditive bubble have slightly higher medium values (table 4) (2,4,5).

Following the descriptive analysis of the skull characteristics investigated for the species *Apodemus sylvaticus*, we can notice that among the body metrical characteristics, the lowest values of the variability indices were recorded for the ear length (16,23±0,22) and the hind paw length (21,44±0,28), in comparison with the body length (90,2±1,97) and the tail length (87,38±1,76).

For the skull characteristics, lower variability degrees were noticed for the following characteristics: auditive bubble width (2,7±0,02), auditive bubble length (2,96±0,04), the length of the jugal teeth lower row (3,31±0,04), the length of the jugal teeth upper row (4,03±0,03) and the interorbital constriction (3,93±0,04) (table 5, fig. 3).

In the table 6 we realized a comparative study between our results and those obtained by other authors, for a part of the investigated characteristics. Thus, we can notice that the population investigated by us is different to those investigated by V. SIMIONESCU (1965), V. BANARU (1998) and M. POPOVICI (2006) through the medium values of the following characteristics: body length, tail length, interorbital constriction and auditive bubble length.

Conclusions

For the characterization of some rodent populations in the middle basin of the Siret river, we investigated 4 body characteristics (body length, tail length, ear length, hind paw length) and 10 skull characteristics (nasal bone length, interorbital constriction, zygomatic width, candilobasal length, length of the jugal teeth upper row, diastema length, length of the jugal teeth lower row, auditive bubble length, auditive bubble width) in 3 rodent species: *Mus spicilegus, Apodemus flavicollis* and *Apodemus sylvaticus.*

The data obtained by us confirm, mainly, the data in the specialty literature.

Rezumat

Lucrarea prezintă rezultatele prelucrării statistice a 14 caractere corporale şi craniometrice de la 3 specii: *Mus spicilegus, Apodemus flavicollis* şi *Apodemus sylvaticus*

Pentru specia *Mus spicilegus* valorile cele mai mici ale indicilor de variabilitate au fost înregistrate pentru lungimea şirului inferior de dinţi jugali (2,59±0,07) şi lăţimea bulei auditive (2,95±0,03).

Gradul cel mai scăzut de variabilitate pentru specia *Apodemus flavicollis* l-au avut următoarele caractere craniene: lăţimea bulei auditive (3,21±0,1), lungimea şirului superior de dinţi jugali (3,82±0,01) şi constricţia interorbitală (4,11±0,03).

La specia *Apodemus sylvaticus* grade mai mici de variabilitate au fost remarcate pentru următoarele caractere: lăţimea bulei auditive (2,7±0,02), lungimea bulei auditive (2,96±0,04), lungimea şirului inferior de dinţi jugali (3,31±0,04), lungimea şirului superior de dinţi jugali (4,03±0,03) şi constricţia interorbitală (3,93±0,04).

Datele obţinute au fost comparate cu cele din literatura de specialitate, pe care le confirmă.

References

1. BANARU, V., 1998 – *Cercetări faunistice, ecologice, biometrice şi biologice referitoare la populaţiile de micromamifere (Insectivora, Rodentia) din bazinul Someşului Mic.* Teză de doctorat, Facultatea de Biologie-Geologie, Universitatea „Babeş-Bolyai" Cluj, 1-368.

2. HELLWING, S., GHIZELEA, G., 1963 – Small mammals from the outskirts of Jassy. *Travaux* du Muséum d'Histoire Naturell „Grigore Antipa", Bucureşti: 497-519.

3. PARASCHIV, D., 2011 – *Biodiversitatea mamiferelor mici (Mammalia: Rodentia) din bazinul mijlociu al râului Siret.* Teză de doctorat, Facultatea de Biologie, Universitatea „Al. I. Cuza" Iaşi, 50-59.

4. POPOVICI, M., 2006 – *Biodiversitatea mamiferelor mici (Mammalia: Rodentia, Insectivora) din diferite agroecosisteme din nordul Moldovei.* Teză de doctorat, Facultatea de Biologie, Univ. Al. I. Cuza, Iaşi, 369 p.

5. SIMIONESCU, V., 1965 – Contribuţii la cunoaşterea sistematicii şi răspândirii geografice a faunei de rozătoare din Moldova. *Anal. Univ. St. Iaşi*: 127-140.

6. VARVARA, M., ZAMFIRESCU, ŞT., NEACŞU, P., 2001 – *Lucrări practice de ecologie – manual*. Edit. Univ. „Al. I. Cuza", Iaşi: 2-6.

Table 1 – Biometrical characteristics for *Mus spicilegus* in the middle basin of the Siret river

No.	Biometric characters	n	min.	max.	M	Ω	± m	δ	C	m%
1	Body length	31	65.2	85.4	74.87	20.2	0.99	5.54	7.4	1.32
2	Tail length	31	52.3	65.4	58.59	13.1	0.62	3.46	5.91	1.06
3	Ear length	31	9.6	13.8	12.44	4.2	0.13	0.75	6.03	1.05
4	Hind paw length	31	13.2	18.2	16.13	5	1.55	1.39	8.62	1.55
5	Nasal bone length	31	6.4	8.8	7.53	2.4	0.09	0.48	6.37	1.19
6	Interorbital constriction	31	3.2	3.9	3.51	0.7	0.03	0.14	3.99	0.85
7	Zygomatic width	31	9.8	12	11.01	2.2	0.09	0.49	4.45	0.82
8	Candilobase length	31	17.9	20.8	19.42	2.9	0.13	0.69	3.55	0.67
9	Skull width	31	9.3	10.9	10	1.6	0.06	0.33	3.3	0.6
10	Width of the upper jugal teeth row	31	3.1	3.9	3.49	0.8	0.02	0.13	3.72	0.57
11	Diastema length	31	4.2	5.8	5.06	1.6	0.1	0.58	4.6	1.98
12	Length of the lower jugal teeth row	31	2.2	3.1	2.59	0.9	0.07	0.04	1.54	2.7
13	Auditive bubble length	31	3.2	4.5	3.86	1.3	0.05	0.26	6.74	1.3
14	Auditive bubble width	31	2.4	3.5	2.95	1.1	0.03	0.17	5.76	1.02

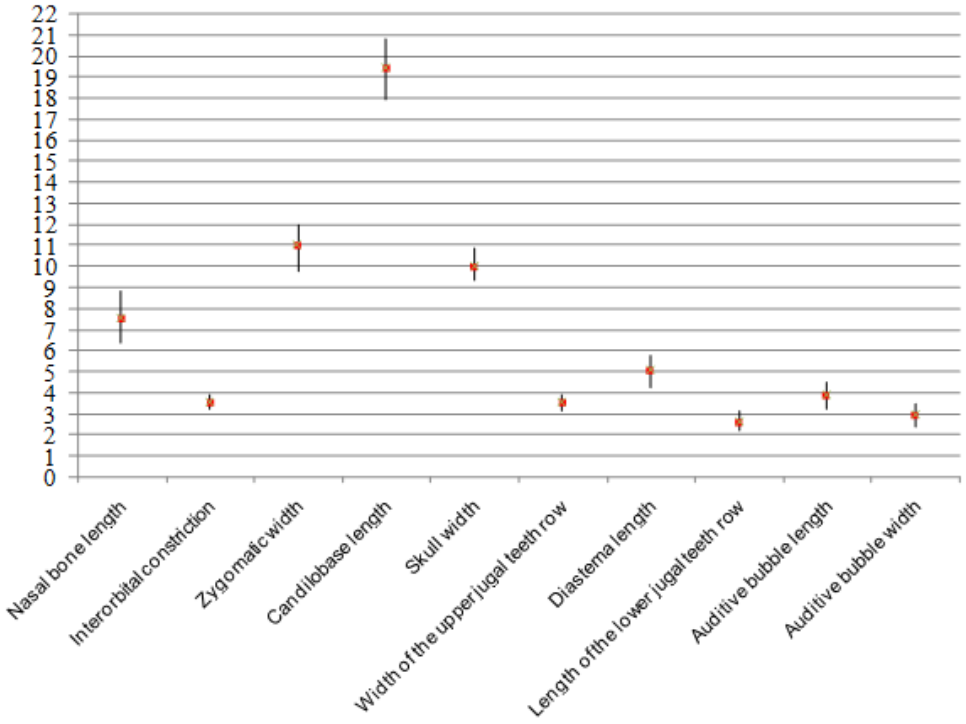

Fig.1 - Graphical representation of the mean and variability of the skull characters for the *Mus spicilegus* species

Table 2 – Values of the biometric characters for the *Mus spicilegus* species compared with other previous studies

No.	Biometric characters	Authors			Personal study (M± m)
		S. HELWING şi GHIZELEA (1963) (M)	V. SIMIONESCU (1965) (M± m)	M. POPOVICI (2006) (M± m)	
1	Body length	68.84	75.1±1.47	71.46±0.22	74.87±0.99
2	Tail length	67.86	61.35±0.96	59.85±0.11	58.59±0.62
3	Ear length	12.19	12.12±0.21	13.23±0.05	12.44±0.13
4	Hind paw length	15.6	15.72±0.12	16.02±0.05	16.13±1.55
5	Nasal bone length	6.03	7.15±0.11	8.01±0.03	7.53±0.09
6	Interorbital constriction	3.45	3.35±0.03	3.75±0.01	3.51±0.03
7	Zygomatic width	-	11.34±0.11	11±0.04	11.01±0.09
8	Candilobase length	17.09	19.44±0.19	19.48±0.03	19.42±0.13
9	Skull width	-	-	10.29±0.02	10±0.06
10	Width of the upper jugal teeth row	-	3.20±0.04	3.56±0.01	3.49±0.02
11	Diastema length	5.6	5.32±0.07	5.64±0.01	5.06±0.1
12	Length of the lower jugal teeth row	-	2.79±0.03	3.46±0.01	2.59±0.07
13	Auditive bubble length	-	-	3.86±0.02	3.86±0.05
14	Auditive bubble width	-	-	2.98±0.01	2.95±0.03

Table 3 – Biometrical characteristics for *Apodemus flavicollis* in the middle basin of the Siret river

No.	Biometric characters	n	min.	max.	M	Ω	± m	δ	C	m%
1	Body length	34	85.3	113.9	99.57	28.6	1.37	7.98	8.01	1.38
2	Tail length	34	84.2	111	98	26.8	1.17	6.84	6.98	1.19
3	Ear length	34	14.4	19.8	17.04	5.4	0.27	1.59	9.33	1.58
4	Hind paw length	34	19.8	24.4	22.06	4.6	0.19	1.13	5.12	0.86
5	Nasal bone length	34	7.9	10.9	9.67	3	0.03	0.17	1.76	0.31
6	Interorbital constriction	34	3.9	4.3	4.11	0.4	0.03	0.18	4.38	0.73
7	Zygomatic width	34	12.2	14	13.15	1.8	0.03	0.19	1.44	0.23
8	Candilobase length	34	23.3	16.7	24.85	3.4	0.14	0.82	3.3	0.56
9	Skull width	34	9.2	11.3	10.24	2.1	0.08	0.47	4.59	0.78
10	Width of the upper jugal teeth row	34	3.3	4.6	3.83	1.3	0.01	0.08	2.09	0.26
11	Diastema length	34	5.7	7.9	6.66	2.2	0.09	0.52	7.81	1.35
12	Length of the lower jugal teeth row	34	3.5	5.1	4.23	1.6	0.03	0.16	3.78	0.71
13	Auditive bubble length	34	3.2	6.3	4.68	3.1	0.11	0.67	4.32	2.35
14	Auditive bubble width	34	1.9	4.7	3.21	2.8	0.1	0.61	1.9	3.12

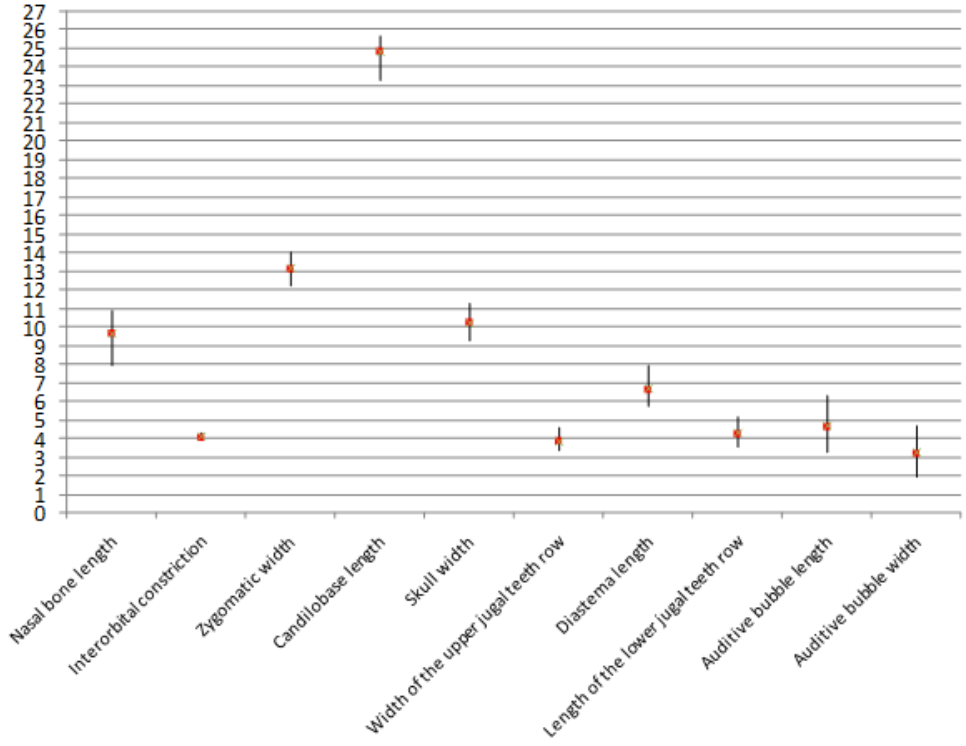

Fig. 2 - Graphical representation of the mean and variability of the skull characters for the *Apodemus flavicollis* species

Table 4 – Values of the biometric characters for the *Apodemus flavicollis* species compared with other previous studies

No.	Biometric characters	Authors			Personal study (M± m)
		V. SIMIONESCU (1965) (M± m)	V. BANARU (1998) (M± m)	M. POPOVICI (2006) (M± m)	
1	Body length	100.5±2.62	97.2±4.46	99.2±0.13	99.57±1.37
2	Tail length	104.50±3.05	106.87±7.33	100.13±0.73	98±1.17
3	Ear length	16.85±0.40	17.17±0.74	16.2±0.15	17.04±0.27
4	Hind paw length	23.25±0.34	24.07±0.78	22.06±0.16	22.06±0.19
5	Nasal bone length	10.35±0.21	-	8.88±0.08	9.67±0.03
6	Interorbital constriction	4.25±0.06	4.26±0.11	4.74±0.05	4.11±0.03
7	Zygomatic width	1385±0.25	-	12.81±0.08	13.15±0.03
8	Candilobase length	25.15±0.47	25.95±0.70	24.10±0.05	24.85±0.14
9	Width of the upper jugal teeth row	4.23±0.05	4.15±0.07	4.23±0.05	3.83±0.01
10	Diastema length	6.90±0.07	-	6.21±0.07	6.66±0.09
11	Length of the lower jugal teeth row	4.17±0.04	-	4.28±0.06	4.23±0.03
12	Auditive bubble length	-	-	3.98±0.08	4.68±0.11
13	Auditive bubble width	-	-	2.7±0.08	3.21±0.1

Table 5 – Biometrical characteristics for *Apodemus sylvaticus* in the middle basin of the Siret river

No.	Biometric characters	n	min.	max.	M	Ω	± m	δ	C	m%
1	Body length	21	73.2	106	90.2	32.8	1.97	9.05	10.03	2.19
2	Tail length	21	71	100	87.38	29	1.76	8.08	9.25	2.01
3	Ear length	21	13.6	18.5	16.23	4.9	0.22	1.03	6.34	0.13
4	Hind paw length	21	18.9	24	21.44	5.1	0.28	1.28	5.97	1.31
5	Nasal bone length	21	7.7	10.2	8.84	2.5	0.10	0.48	5.43	1.13
6	Interorbital constriction	21	3.5	4.4	3.93	0.9	0.04	0.18	4.58	1.02
7	Zygomatic width	21	11.2	13.3	12	2.1	0.14	0.62	5.16	1.17
8	Candilobase length	21	20. 4	25.2	22.64	4.8	0.21	0.95	4.2	0.93
9	Skull width	21	8.7	10.28	9.35	1.58	0.08	0.36	3.85	0.86
10	Width of the upper jugal teeth row	21	3.8	4.3	4.03	0.5	0.03	0.12	2.98	0.74
11	Diastema length	21	5.3	7.4	6.22	2.1	0.1	0.48	7.72	1.62
12	Length of the lower jugal teeth row	21	2.8	4	3.31	1.2	0.04	0.19	5.74	1.21
13	Auditive bubble length	21	2.2	3.8	2.96	1.6	0.04	0.21	7.09	1.35
14	Auditive bubble width	21	1.5	2.7	2.29	1.2	0.02	0.1	4.37	0.87

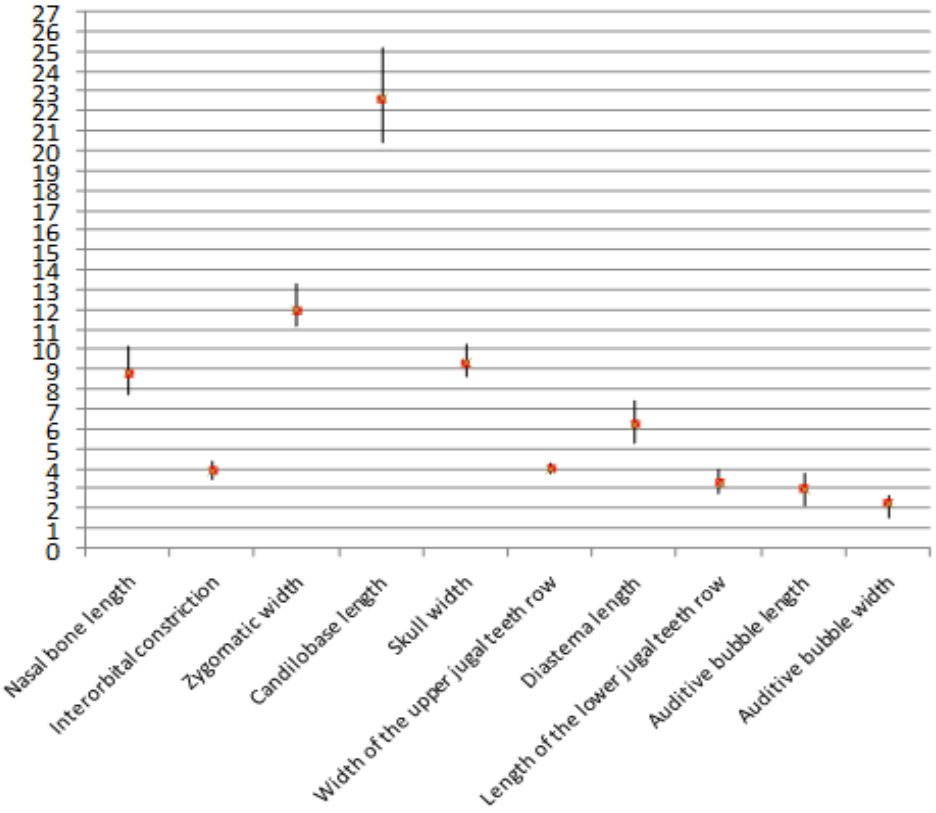

Fig. 3 - Graphical representation of the mean and variability of the skull characters for the *Apodemus sylvaticus* species

Table 6 – Values of the biometric characters for the *Apodemus sylvaticus* species compared with other previous studies

No.	Biometric characters	Authors			Personal study (M± m)
		V. SIMIONESCU (1965) (M± m)	V. BANARU (1998) (M± m)	M. POPOVICI (2006) (M± m)	
1	Body length	85.56±1.55	86.84±6.46	86.31±1.22	90.2±1.97
2	Tail length	82±1.30	84.45±8.47	82.27±1.13	87.38±1.76
3	Ear length	15.73±0.17	15.8±1.58	15.62±0.14	16.23±0.22
4	Hind paw length	21.22±0.21	22.18±1.19	21.97±0.13	21.44±0.28
5	Nasal bone length	9.07±0.10	-	8.46±0.02	8.84±0.10
6	Interorbital constriction	4.02±0.03	4.07±0.19	4.48±0.02	3.93±0.04
7	Zygomatic width	12.46±0.09	12.77±0.52	12.57±0.05	12±0.14
8	Candilobase length	22.67±0.19	23.8±1.105	23.70±0.05	22.64±0.21
9	Width of the upper jugal teeth row	3.88±0.04	3.87±0.23	3.41±0.02	4.03±0.03
10	Diastema length	6.39±0.06	7.03±0.45	6.6±0.05	6.22±0.1
11	Length of the lower jugal teeth row	3.71±0.04	-	3.46±0.01	3.31±0.04
12	Auditive bubble length	-	-	3.7±0.02	2.96±0.04
13	Auditive bubble width	-	-	2.47 ±0.02	2.29±0.02